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November 24, 1997

PG&E Letter DCL-97-195



U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Docket No. 50-323, OL-DPR-82
Diablo Canyon Unit 2
Licensee Event Report 2-97-005-00
Reactor Trip and Safety Injection Caused by Inadvertent Main Steam Isolation
Valve Closure Due to Personnel Error

Dear Commissioners and Staff:

PG&E is submitting the enclosed Licensee Event Report, 2-97-005-00, regarding a reactor trip and safety injection caused by inadvertent closure of a main steam isolation valve due to personnel error.

This event did not adversely affect the health and safety of the public.

Sincerely,


Robert P. Powers

cc: Steven D. Bloom
Ellis W. Merschoff
Kenneth E. Perkins
David L. Proulx
Diablo Distribution
INPO

Enclosure

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SUBJECT: Forwards LER 97-005-00, which describes reactor trip & safety injection caused by inadvertent closure of MSIV due to personnel error.

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LICENSEE EVENT REPORT (LER)

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TITLE (4)
Reactor Trip and Safety Injection Caused by Inadvertent Main Steam Isolation Valve Closure Due to Personnel Error

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)																
MON	DAY	YR	YR	SEQUENTIAL NUMBER				REVISION NUMBER		MON	DAY	YR	FACILITY NAME						DOCKET NUMBER						
10	24	97	97	-	0	0	5	-	0	0	11	24	97												

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (11) <div style="display: flex; justify-content: space-around;"> <input checked="" type="checkbox"/> 10 CFR 50.73(a)(2)(iv) <input checked="" type="checkbox"/> OTHER Special Report per TS 3.4.9.3.d </div>														
POWER LEVEL (10) 1 0 0															
(SPECIFY IN ABSTRACT BELOW AND IN TEXT, NRC FORM 366A)															

LICENSEE CONTACT FOR THIS LER (12)															
Vickie A. Backman - Senior Regulatory Services Engineer												TELEPHONE NUMBER			
												AREA CODE		805 545-4289	

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRPDS

SUPPLEMENTAL REPORT EXPECTED (14)					EXPECTED SUBMISSION DATE (15)				
[] YES (If yes, complete EXPECTED SUBMISSION DATE)					[X] NO				

ABSTRACT (16)

On October 24, 1997, at 0815 PDT, with Unit 2 in Mode1 (Power Operation) at 100 percent reactor power, a reactor trip (RT) and safety injection (SI) occurred due to inadvertent closure of a main steam isolation valve. One power operated relief valve lifted to relieve reactor coolant system (RCS) pressure seven times during recovery from the RT and SI. The SI actuation signal was reset at 0829 PDT.

An unusual event (UE) was declared for this event at 0832 PDT. The San Luis Obispo County Sheriff's Office Watch Commander was notified at 0837 PDT. A 1-hour emergency report was made to the NRC, in accordance with 10 CFR 50.72(a)(1)(i) at 0900 PDT.

On October 24, 1997, at 0938 PDT, following stabilization of Unit 2 in Mode 3 (Hot Standby), the UE was terminated. This was the twelfth Unit 2 emergency core cooling system actuation cycle that resulted in a discharge of water into the RCS.

The cause of the event was inadvertent actuation of the closed position switch for FCV-44 by a contract laborer removing scaffolding adjacent to the valve.

Corrective actions to prevent recurrence include: (1) revision of the scaffolding program procedure and risk assessment procedure and (2) issuance of a maintenance policy to require a risk assessment and management approval for nonroutine work near critical components.

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TEXT

I. Plant Conditions

Unit 2 was in Mode 1 (Power Operation) at approximately 100 percent power.

II. Description of Problem

A. Summary

On October 24, 1997, at 0815 PDT, Unit 2 experienced a reactor trip (RT) and safety injection (SI) due to inadvertent closure of main steam isolation valve (MSIV)(SB) on Steam Lead 4 (FCV-44). One power operated relief valve (PORV)(PCV-455C) lifted to relieve reactor coolant system (RCS) (AB) pressure seven times during recovery from the RT and SI. This was the twelfth Unit 2 emergency core cooling system (ECCS) actuation cycle that resulted in a discharge of water into the RCS.

B. Background

Each main steam line has one quick acting MSIV and one check valve, both of the swing check type, located outside the containment and downstream of the main steam line safety valves.

Each MSIV is opened by air and closes when either of the redundant solenoid valves in its vent line are energized, releasing the air. The closed limit switch provides position indication and a seal-in circuit to maintain the MSIV closed by continuous venting of the supply air.

C. Event Description

On October 22, 1997, a contract work crew requested Operations Department permission to erect scaffold in the 115 ft. Auxiliary Building penetration area. In accordance with the restriction of work in the vicinity of critical components contained in Administrative Procedure (AP) AD7.ID5, "Scaffold Material Structures," the assigned crew received a tailboard and walkdown of the work area. The walkdown was performed by plant operators, the scaffold foreman, and assigned crew members.

On October 24, 1997, at approximately 0800 PDT the scaffold foreman requested Operations Department permission to remove the scaffold structure in the 115 ft. area. The foreman was recognized by the Operations Department personnel as the same person requesting

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TEXT

installation on October 22. Due to the recent walkdown performed and recognition by operations personnel, no additional tailboard or walkdown was performed. The scaffold crew, composed of two previous crew members and two new crew members, proceeded to the 115 ft. area. A new crew member proceeded to remove scaffold material adjacent to MSIV FCV-44 when he reported hearing an air actuation noise followed by closure actuation of the valve.

On October 24, 1997, at 0815 PDT, Unit 2 experienced a RT and SI due to inadvertent closure of MSIV FCV-44. The RT and SI initiated as a result of low steam line pressure on the unaffected steam generators (SGs).

On October 24, 1997, between 0826 and 0831 PDT, one PORV (PCV-455C) lifted seven times as required to relieve pressure following the SI addition of RCS inventory and thermal expansion following the transient.

On October 24, 1997, at 0829 PDT, plant operators reset the safety injection signal.

On October 24, 1997, at 0831 PDT, plant operators stopped Centrifugal Charging Pump 2-1 and initiated actions to restore normal charging and letdown flow conditions.

On October 24, 1997, at 0832 PDT, an UE was declared in accordance with plant procedures regarding a RT with SI.

On October 24, 1997, at 0837 PDT, chemical and volume control system letdown was placed in service. Pressurizer level peaked at an indicated 92 percent level and a slow level reduction was commenced.

On October 24, 1997, at 0938 PDT, following stabilization of the unit in Mode 3, the UE was terminated.

D. Inoperable Structures, Components, or Systems that Contributed to the Event

None.

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E. Dates and Approximate Times for Major Occurrences

1. October 24, 1997, at 0815 PDT: Event date: RT and SI initiated.
2. October 24, 1997, at 0831 PDT: SI signal was reset.
3. October 24, 1997, at 0832 PDT: A UE was declared
4. October 24, 1997, at 0837 PDT: UE notifications were initiated.
5. October 24, 1997, at 0938 PDT: Following Unit 2 stabilization in Mode 3, the UE was terminated.

F. Other Systems or Secondary Functions Affected

None.

G. Method of Discovery

The event was immediately apparent to plant operators due to alarms and indications received in the control room.

H. Operator Actions

Licensed plant operators responded to alarms and indications in the control room in accordance with established plant emergency procedures. Plant operators confirmed the RT, verified proper engineered safety features actuation, reset the SI signal, and initiated manual actions to stabilize the Unit in Mode 3.

I. Safety System Responses

1. SI automatically initiated on coincident low steam line pressure logic. The ECCS started and injected borated water from the refueling water storage tank into the RCS.
2. The main turbine [TA][TRB] and generator [TB][GEN] tripped.
3. The RT breakers [AA][BKR] opened deenergizing the control rod drive mechanisms [AA][DRIV] and allowed control rods to drop into the core.

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4. Both motor driven auxiliary feedwater (AFW) pumps [BA][P] and the turbine driven AFW pump started automatically in accordance with plant design.
5. Diesel Generators 2-1, 2-2, and 2-3 [EK][DG] started as required upon receipt of the SI signal, but by design did not close onto their 4 kV buses since startup power was available.

III. Cause of the Problem

A. Immediate Cause

Contract maintenance personnel inadvertently actuated a MSIV closure limit switch while removing scaffold material from the area adjacent to the MSIV on Steam Lead 4.

The closure of one MSIV caused higher steam flow and lower steam line pressure in the other three steam lines. The steam line pressure protection system is rate sensitive such that the rapid decrease of approximately 12-15 psi is interpreted by design as greater than 100 psi pressure decrease. Thus, the SI initiate signal was momentarily activated for Steam Lead 1. Due to a momentary signal all MSIVs received isolation signals but did not close prior to steam line pressure recovery resetting the signal.

B. Root Cause

The root cause of the event was personnel error (cognitive) by a contract scaffolding laborer newly assigned to the crew for scaffold disassembly.

C. Contributory Cause

1. Procedural deficiency, in that the procedure that governs high risk work on power plant equipment (AD7.ID5) was applicable to work on plant equipment which was capable of generating a reactor trip or transient, but did not consider activities in the immediate vicinity of such components.
2. The Operations Department personnel approving the removal of scaffolding assumed that since the scaffold personnel requesting

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TEXT

work authorization were the same as the original installation requester two days previous that additional tailboard and/or walkdown was not required.

3. The scaffold crew members performing the removal work did not completely understand the trip hazard and/or did not clearly transfer the information to the new crew member regarding the switches.

IV. Analysis of the Event

This event is bounded by the inadvertent RT and SI previously analyzed Condition II event described in the Final Safety Analysis Report (FSAR) Update, Section 15.2.15, "Spurious Operation of the Safety Injection System at Power." The FSAR Update analysis concludes that an inadvertent SI at power, with or without immediate RT, does not adversely affect the core, the RCS, or the main steam system since the AFW flow capacity is such that RCS cooling is maintained. The plant operator actions taken during this event and recovery were in accordance with plant emergency operating procedures.

The physical forces involved with this event are bounded by the MSIV closure previously analyzed in FSAR Update, Appendix 5.5A, "Capability of Main Steam Isolation and Check Valves to Withstand Closure Loads Following a Postulated Main Steam Line Break." The FSAR Update evaluated loads represent a closure at 130 percent design steam flow with no damage to the valve or associated piping.

Therefore, the health and safety of the public were not adversely affected by this event.

V. Corrective Actions

A. Immediate Corrective Actions

PG&E initiated event response plan (97-04) to investigate the cause of the event and document the immediate corrective actions required to return the Unit to Mode 1.

1. A general plant memorandum was issued to advise the plant staff of the cause of the event and the lessons learned. All outage

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services and maintenance services personnel were given a tailboard regarding this event and the lessons learned.

2. A 30 day "work stoppage" of scaffolding and painting was initiated for any activities in areas identified as containing critical plant components.
3. A maintenance/outage services policy was issued to require a risk assessment and management approval for any nonroutine work on or near plant components or areas containing significant plant trip hazards .

B. Corrective Actions to Prevent Recurrence.

1. The scaffolding program procedure (AD7.ID5) will be revised to add requirements for tailboards prior to scaffold teardown.
2. The procedure describing maintenance risk assessment (MA1.DC10) will be revised to include requirements for working in plant areas where significant reactor trip/transient hazards are present.

VI. Additional Information

A. Failed Components

None.

B. Previous LERs on Similar Problems

LER 1-91-002, reported a Unit 1 RT that occurred due to personnel error (cognitive). Personnel erecting scaffolding in the area of feedwater regulating valve inadvertently closed a valve, which isolated instrument air supply to feedwater regulating and bypass valves. The corrective actions include: (1) issuance of a procedure to secure sensitive air valves against accidental closure; (2) issuance of a maintenance policy requiring that all work to be performed prior to the outage must be on the approved daily schedule; (3) issuance of a work planning policy on marking work packages; and (4) revision of AP C-59, "Elevated Work Structures," to clarify responsibilities and restrictions for erection and removal of scaffolding. The corrective actions taken should have prevented this

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TEXT

event; however, removal of scaffolding was not specifically identified to require an additional walkdown/tailboard regarding plant trip hazards.